District 12
Mobility Performance Report
2012

I-5 & SR-55 Interchange, Orange County. Photo from the Department of California Highway Patrol

California Department of Transportation
Division of Traffic of Operations
Office of Performance

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1. SUMMARY ANALYSIS

Caltrans' District 12 consists of Orange County, located in coastal southern California. Its population was 3.1 million in 2012, an increase of 0.8 percent from 2011 and approximately 8.1 percent of the statewide total population. The county is connected to the north and northwest to Los Angeles County, and bordered to the west and southwest by the Pacific Ocean, to the northeast by Cleveland National Forest, and to the south by Marine Corps Base Camp Pendleton. Major state highways in District 12 include SR-1, I-5, SR-55, SR-91, and I-405. The largest communities in District 12 consist of Anaheim, Santa Ana, and Irvine; and several medium-sized communities, such as Orange, Newport Beach, Huntington Beach, and Mission Viejo among others.

Orange County's economy expanded during 2012. Employment in District 12 grew from 1,460,000 in 2011 to 1,496,000 in 2012, an increase of 35,933 or 2.5 percent. The unemployment rate fell from 8.8 percent in 2011 to 7.6 percent, the lowest rate in California.

Total Vehicle Miles of Travel (VMT) increased during 2012 from 11.7 billion to 11.8 billion, an increase of 0.8 percent. Orange County VMT represented 10.1 percent of VMT for the state in 2012, down from 10.5 percent in 2011. The increase in economic activity, as evidenced in the increase in total jobs, accounts for some of the increase. The significant rise in District 8's VMT, due largely to installation of detection equipment on I-10 and I-15, explains some of the drop in District 12's proportion of total state VMT.

The total amount of delay rose significantly during 2012. The total amount of Vehicle Hours of Delay (VHD) at 35 climbed from 10.2 million VHD at 35 to 12.4 million VHD at 35, or 21 percent. Orange County's share of total statewide VHD at 35 grew sharply from 11.8 percent to 13.2 percent. Although it is unclear why the total VHD at 35 increased by this amount, possible explanations include improvements in the economy, changes in detector health, new detector installation, and incidents. The total VHD at 60 in Orange County experienced a much less pronounced increase. Total VHD at 60 grew from 23.2 million VHD at 60 in 2011 to 26.1 million VHD at 60 in 2012, an increase of 12.4 percent. As a proportion of statewide VHD at 60, Orange County's share rose from 11.4 percent in 2011 to 11.8 percent in 2012, a much less pronounced increase than for VHD at 35. The data indicates that more severe delay increased

much more rapidly than less severe delay, but further studies are required to pinpoint the cause of that trend.

BOTTLENECK CAUSES

Some of the largest bottlenecks in District 12 occur on two routes: SR-57 and I-405. The bottleneck location along southbound SR-57 at SR-22/I-5 is present in both 2011 and 2012. This location is the terminus of SR-57 and a major weave area where there are consecutive ramps, and major connectors to both southbound I-5 and SR-22. During this period the capacity constraints along southbound I-5 result in queuing that spills back onto southbound SR-57.

The bottleneck location along southbound SR-57 at Chapman Avenue is present in 2011 at Rank #10 and is no longer present in 2012 top ten bottlenecks. Although this location fell from the top ten, it is still a bottleneck location based on field observation. This interchange serves a large amount of traffic generated by Cal State University Fullerton, which is just adjacent to the interchange and is upstream of the SR-91 interchange. There is an ongoing project to widen northbound SR-57, which includes construction activities along southbound SR-57 that commenced in late 2010 and has affected the traffic patterns and systems for data detection.

The recurrent bottleneck at southbound I-405 near Edinger Avenue is produced by the lack of capacity of the facility to handle the demand from the mainline and the on-ramp traffic from Edinger Ave. Since the freeway facility has only 4 lanes, the average demand per lane results in a volume –to-capacity ratio bigger than one. This high volume combines with the weaving caused by the HOV ingress traffic, decreasing the overall performance of the facility to Level-of-Service (LOS) F.

The bottleneck at southbound I-405 at Beach Blvd. during 2011 and 2012 is recurrent. This bottleneck is created by traffic congestion and delay created by a southern bottleneck at Edinger Ave. Since the demand in the area is much higher than capacity, the facility operates at LOS F, creating an additional bottleneck.

The main bottlenecks in District 12 are on SR-57 and I-405. The bottleneck along northbound SR-57 at Tonner Canyon dropped from rank #6 in 2011 to rank #9 in 2012 but remains a major bottleneck in the District. There are no completed projects within this area to

account for the 10 percent reduction in delay. There is an ongoing project to widen northbound SR-57, which commenced in late 2010 that has affected the traffic patterns and systems for data detection. This location is a known recurring bottleneck due to the vertical grade. There is an unfunded project to construct a truck climbing lane to help alleviate this bottleneck.

The northbound I-405 bottleneck at Brookhurst St. is produced by the lack of capacity on this four-lane freeway segment to serve the high demand at this location. In addition, the auxiliary lane ending in the vicinity of this segment further deteriorates the operational behavior due to the weaving produced in the area. This situation combines to create a segment operating at LOS F and consequently a bottleneck.

2. DESCRIPTIVE STATISTICS

District Headquarters: Irvine
Counties: Orange
Counties without Detection: none
Population: 3,081,804; 0.8% increase over 2011
Population as a Percentage of Statewide: 8%

Table 1. POPULATION ESTIMATES AND ABSOLUTE AND PERCENT CHANGE, 2011-2012

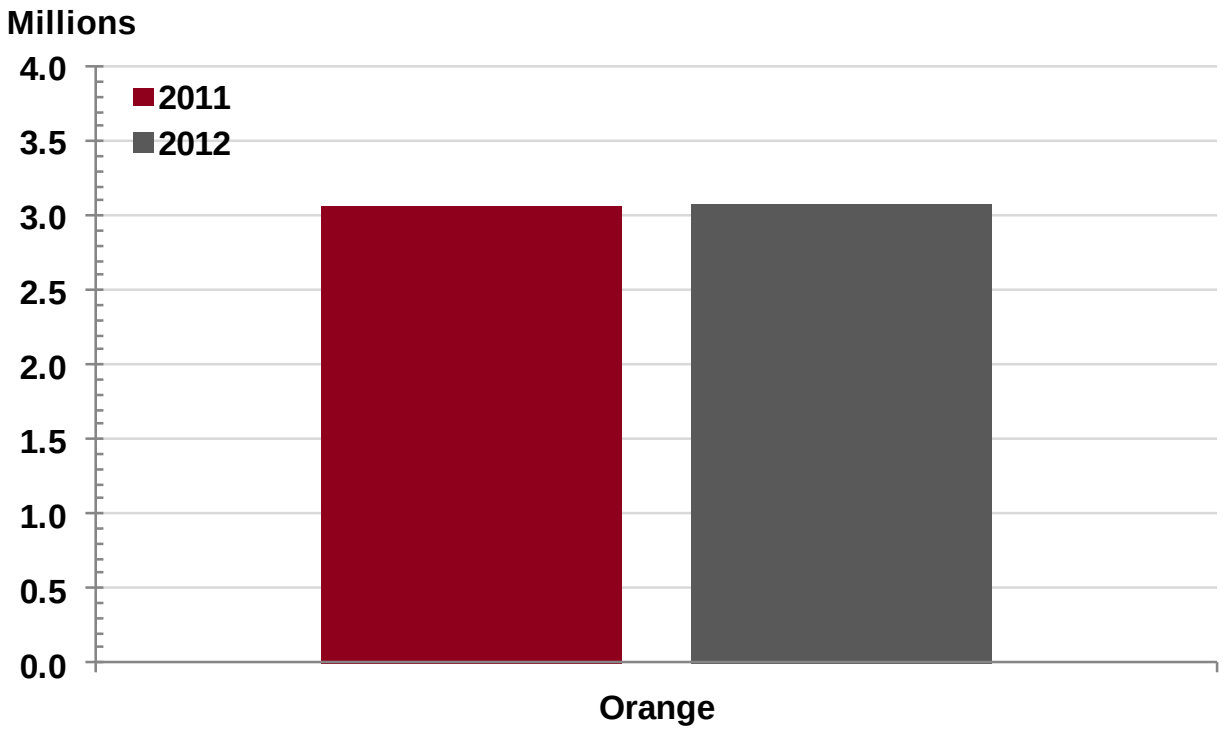
	2011	2012	Difference (2012 - 2011)	
County	**Population**	**Population**	**Absolute**	**Percent**
Orange	3,057,879	3,081,804	23,925	0.8%
Total	**3,057,879**	**3,081,804**	**23,925**	**0.8%**

Source: State of California, Department of Finance, *E-1 Population Estimates for Cities, Counties, and the State—January 1, 2012 and 2013.* Sacramento, California, May 2013.

Numbers may not sum to total due to rounding

FIGURE 1

POPULATION, BY COUNTY, 2011-2012



Employment, 2012 Monthly Average: 1,495,975
Unemployment Rate, 2012 Monthly Average: 7.6%, 1.2% decrease over 2011

Table 2. UNEMPLOYMENT, AND PERCENT CHANGE, BY COUNTY, 2011-2012

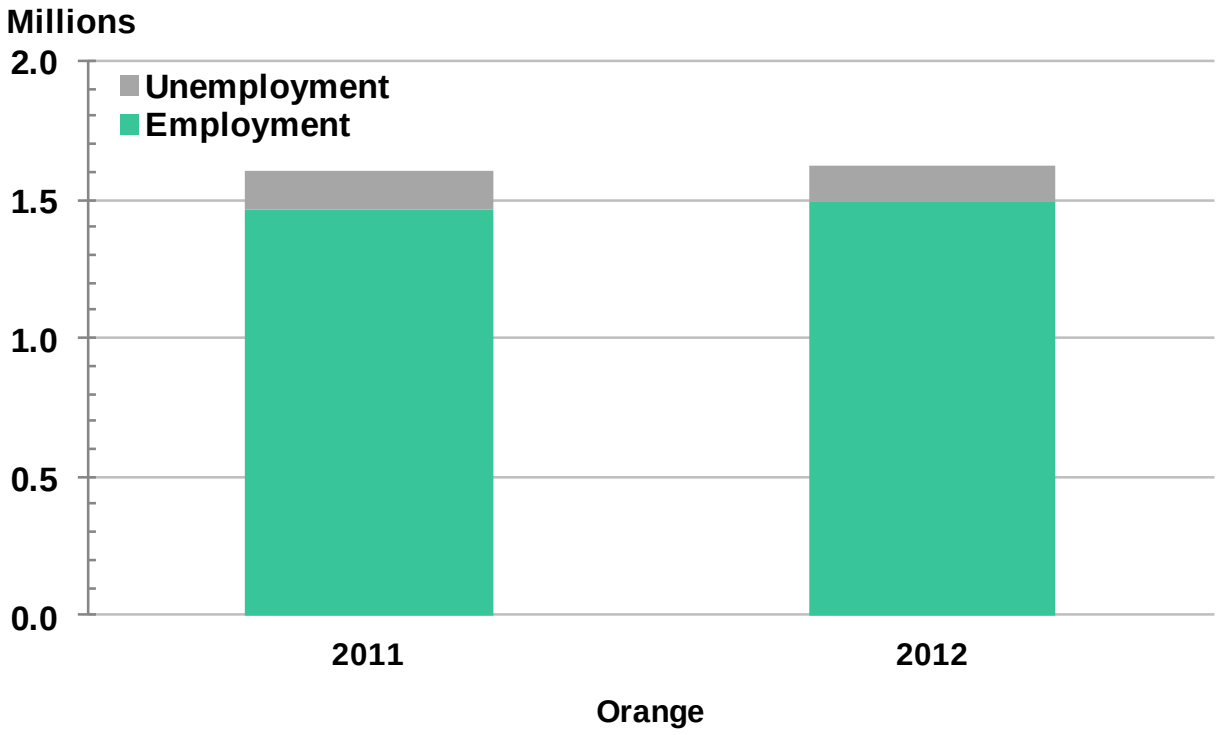
County	Unemployment Rate, 2011	Unemployment Rate, 2012	Percent Change in Rate of Unemployment (2012 - 2011)
Orange	8.8%	7.6%	-1.2%
District Total	**8.8%**	**7.6%**	**-1.2%**

Data not seasonally adjusted.
Source: State of California, Employment Development Department (EDD), Labor Market Information Division; data downloaded Sept. 9, 2013.

Numbers may not sum to total due to rounding

FIGURE 2

EMPLOYMENT AND UNEMPLOYMENT, BY COUNTY, 2011-2012



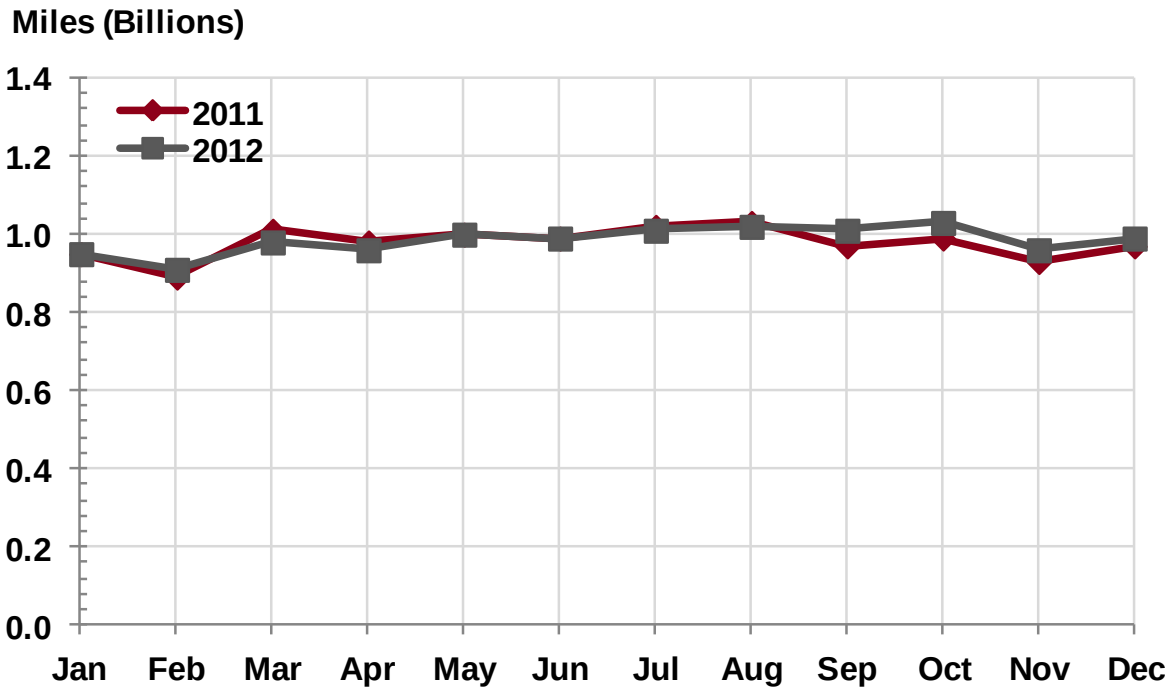
3. TRAVEL DEMAND

Vehicle Miles of Travel, 2012:	11.8 billion miles
Absolute and Percentage Change over 2011:	96.9 million VMT increase; 0.8% increase over 2011
Peak Travel Month, Percentage Change over 2011:	October, 1 billion miles, 4.9% increase over 2011

Monthly Trend

FIGURE 3 (A)

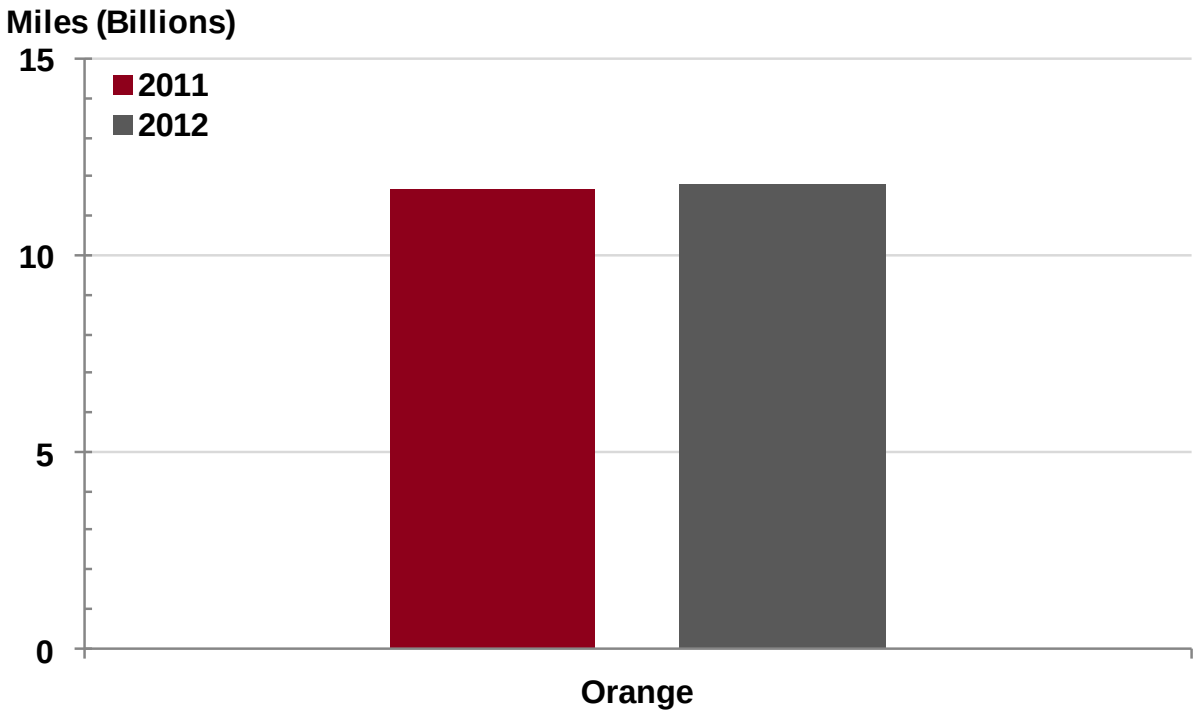
TOTAL VEHICLE MILES OF TRAVEL,BY MONTH, 2011-2012



County Trend

FIGURE 3 (B)

TOTAL VEHICLE MILES OF TRAVEL, BY COUNTY, 2011-2012



4. TRAFFIC CONGESTION

4.1. Total and Average Vehicle Hours of Delay at 35 and 60 Miles per Hour

4.1.1 Delay at 35 Miles per Hour

Vehicle Hours of Delay, 35 mph: 12.4 million hours, 21.5% increase over 2011
Average Non-Holiday Weekday Delay, 35 mph: 42,004 hours, 17.7% increase over 2011
Percentage of Statewide VHD at 35 mph: 13.2%, 1.4% increase over 2011

FIGURE 4

TOTAL VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, BY MONTH, 2011-2012

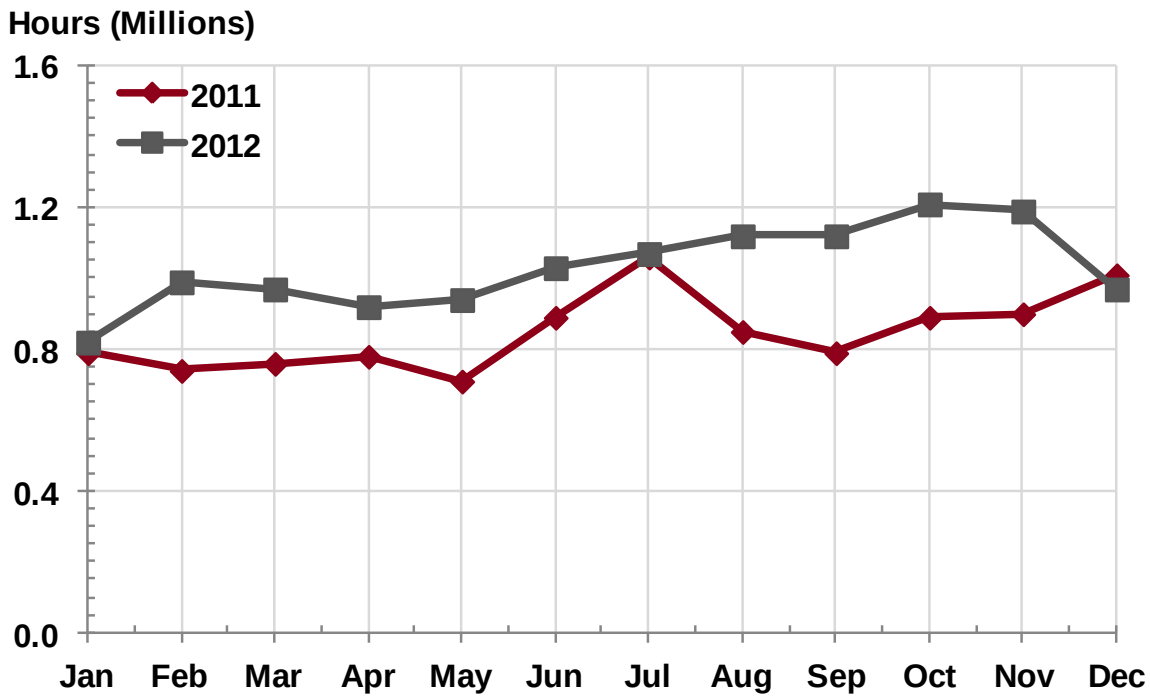
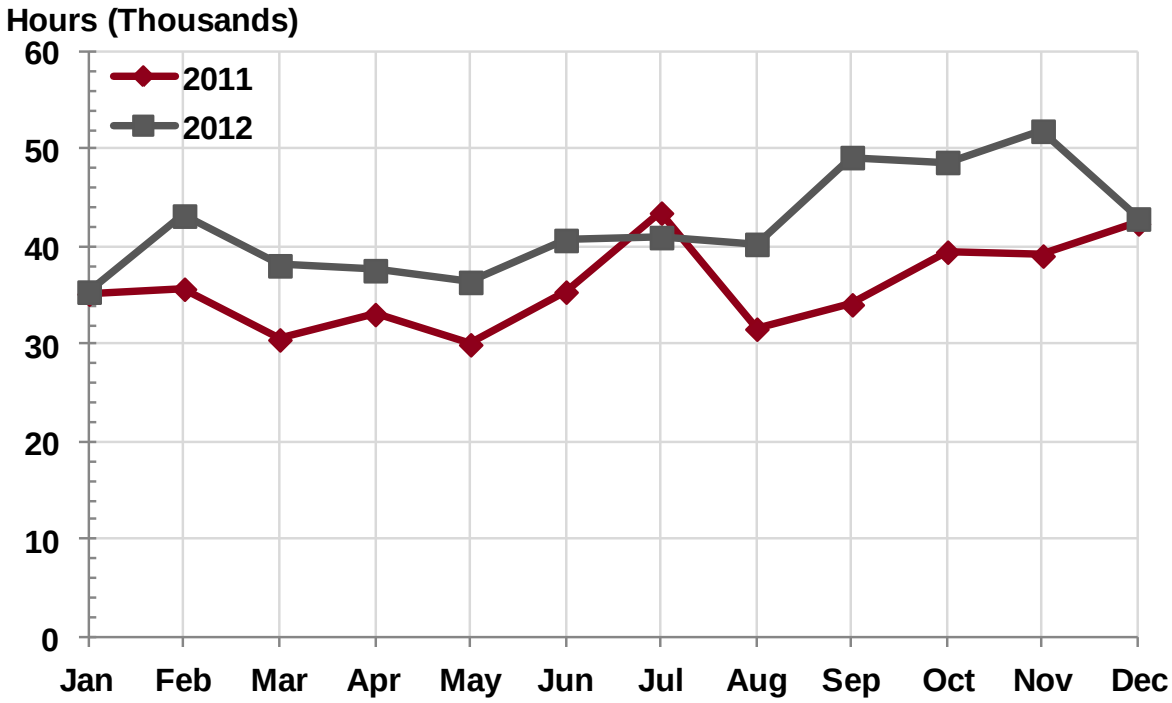


FIGURE 5

AVERAGE NON-HOLIDAY WEEKDAY VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, BY MONTH, 2011-2012



4.1.2 Delay at 60 Miles per Hour

Vehicle Hours of Delay, 60 mph: 26.1 million hours, 12.4% increase over 2011
Average Non-Holiday Weekday Delay, 60 mph: 89,056 hours, 9.8% increase over 2011
Percentage of Statewide VHD at 60 mph: 11.8%, 0.4% increase over 2011

FIGURE 6

TOTAL VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY MONTH, 2011-2012

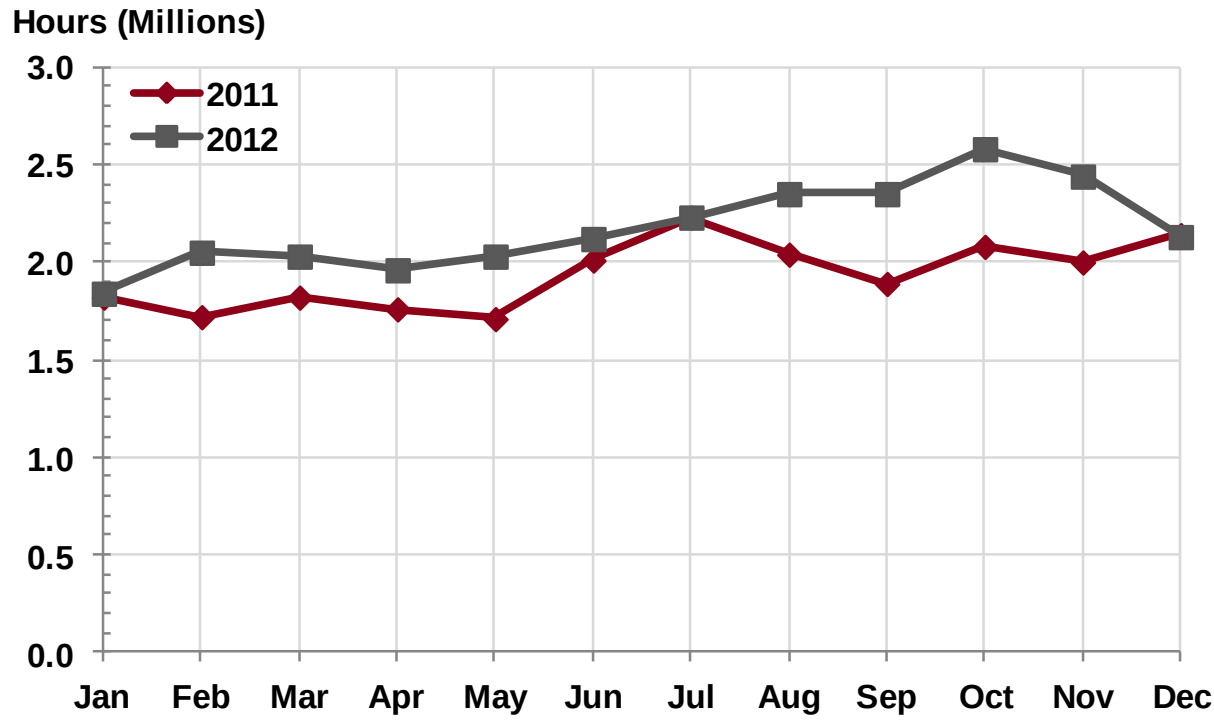
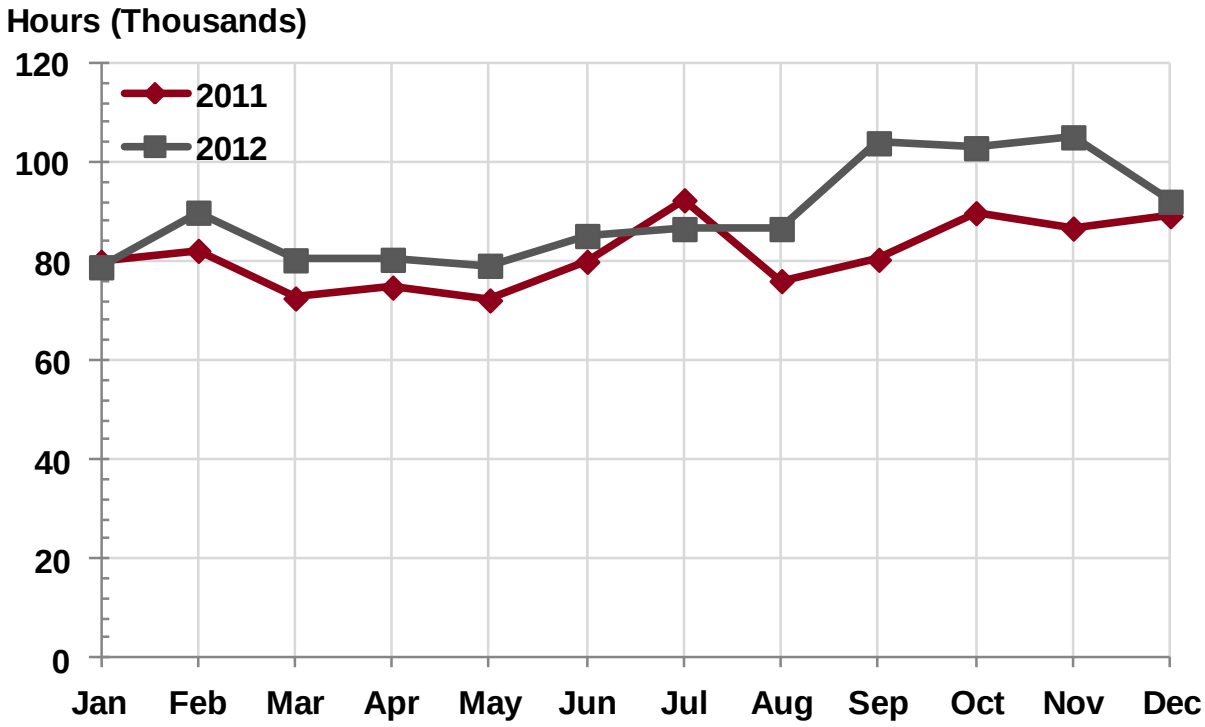


FIGURE 7

AVERAGE NON-HOLIDAY WEEKDAY VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY MONTH, 2011-2012



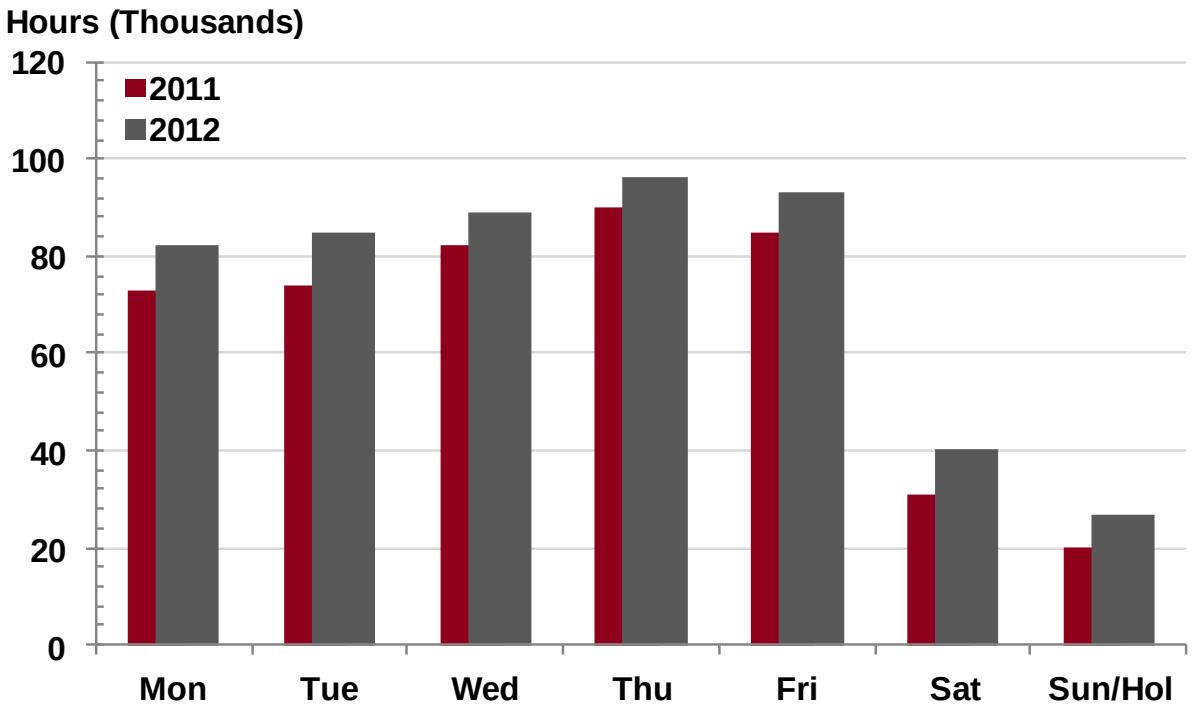
4.2. Average Vehicle Hours of Delay by Day of Week

Most Congested Day of the Week, 60 mph:	Thursday, 96,371 hours, 7% increase over 2011
Highest Absolute Change in Delay, 60 mph:	Tuesday, 10,978 VHD increase, 15% increase over 2011
Highest Percentage Change in Delay:	Sunday/Holiday, 6,761 VHD increase, 33% increase over 2011

Delay at 60 miles per hour

FIGURE 8

AVERAGE VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY DAY OF WEEK, 2011-2012



4.3. Average Vehicle Hours of Delay by Hour of Day

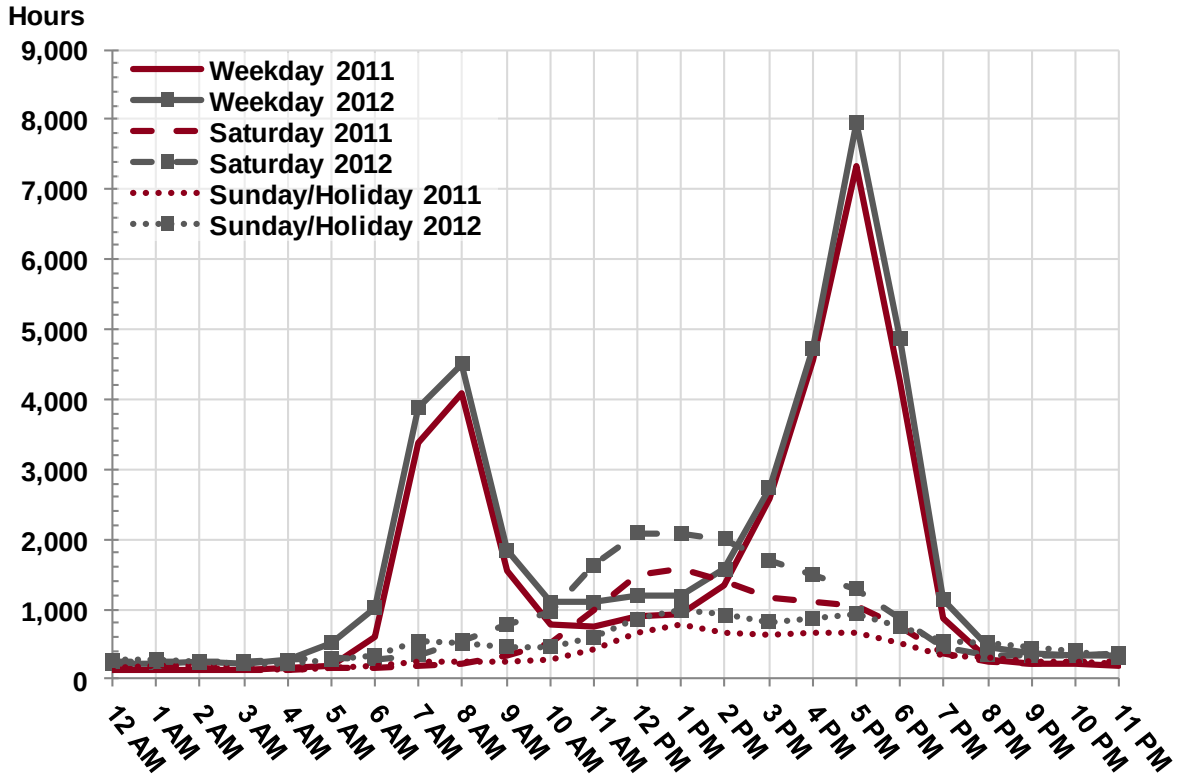
4.3.1 Delay at 35 Miles per Hour

Weekday PM Peak Hour, 35 mph: 5 PM, 7,957 hours, 8% increase over 2011
Weekday AM Peak Hour, 35 mph: 8 AM, 4,508 hours, 10% increase over 2011
Saturday Peak Hour, 35 mph: 12 PM, 2,090 hours, 39% increase over 2011
Sunday/Holiday Peak Hour, 35 mph: 1 PM, 977 hours, 28% increase over 2011

Delay at 35 miles per hour

FIGURE 9

AVERAGE VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, BY HOUR OF DAY, 2011-2012



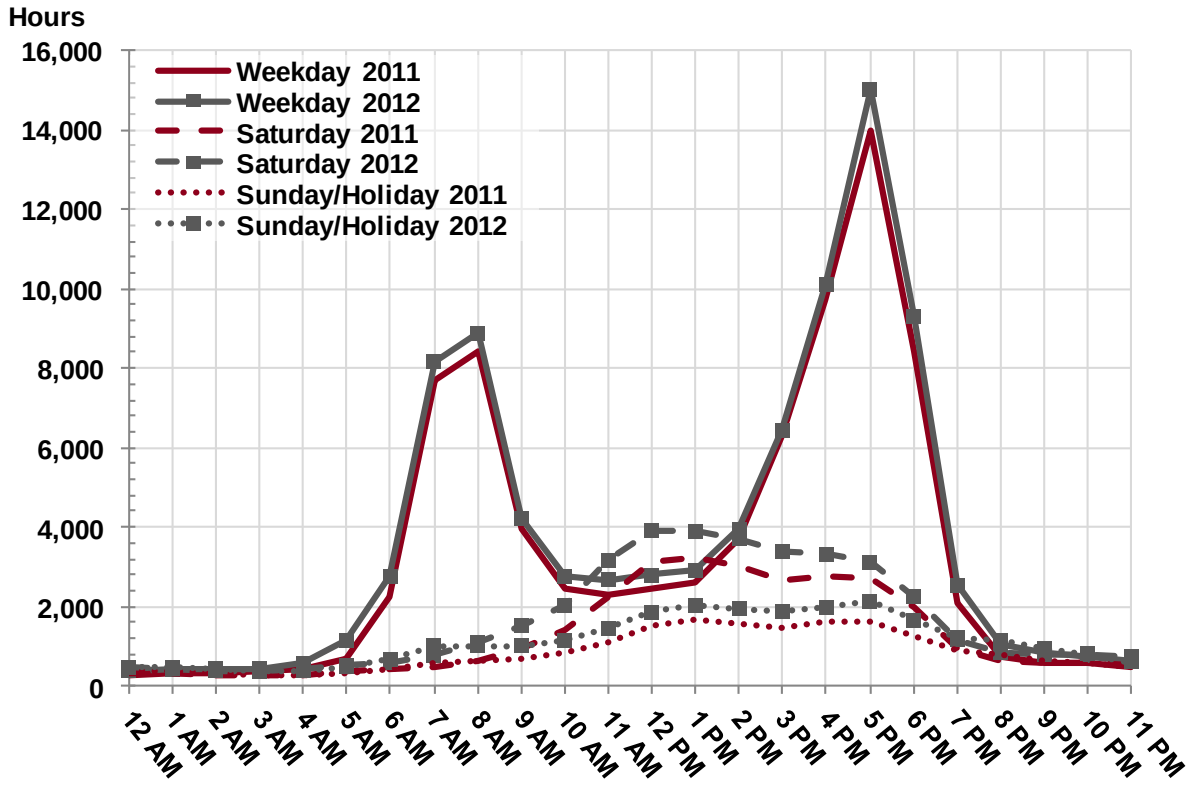
4.3.2 Delay at 60 Miles per Hour

Weekday PM Peak Hour, 60 mph: 5 PM, 15,012 hours, 7% increase over 2011
Weekday AM Peak Hour, 60 mph: 8 AM, 8,871 hours, 5% increase over 2011
Saturday Peak Hour, 60 mph: 12 PM, 3,910 hours, 25% increase over 2011
Sunday/Holiday Peak Hour, 60 mph: 5 PM, 2,111 hours, 32% increase over 2011

Delay at 60 miles per hour

FIGURE 10

AVERAGE VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY HOUR OF DAY, 2011-2012



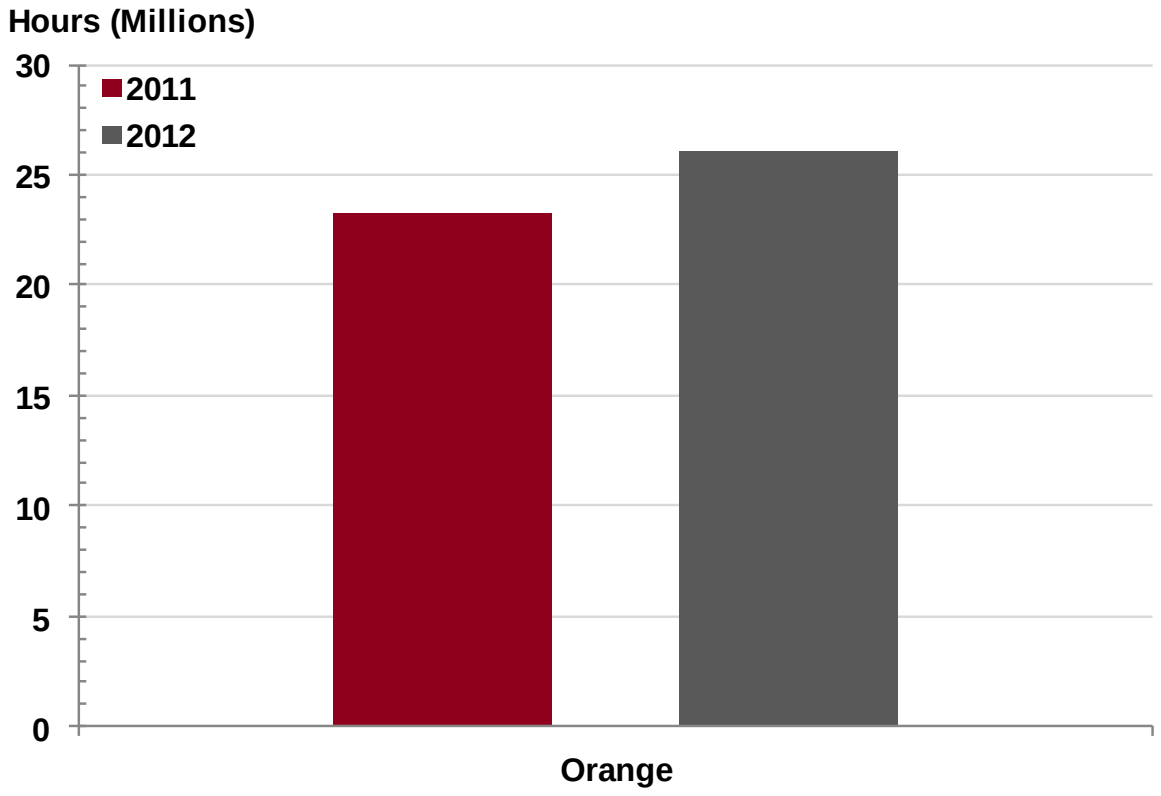
4.4. Total Vehicle Hours of Delay by County

County with Largest Delay, 60 mph: Orange, 26.1 million hours,
12.4% increase over 2011 VHD,
100% of District total VHD

Delay at 60 miles per hour

FIGURE 11

TOTAL ANNUAL VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY COUNTY, 2011-2012



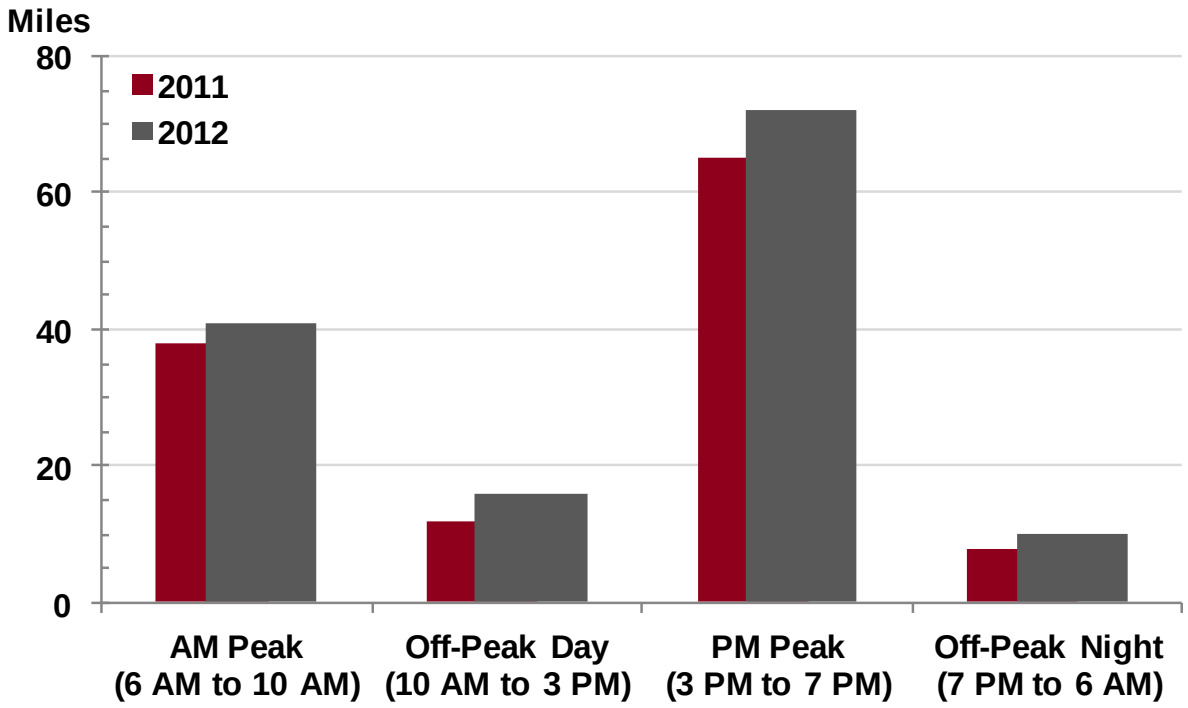
4.5. Lost Productivity

AM Peak:	41 miles, 10.2% increase over 2011
Off-Peak Day:	16 miles, 31.6% increase over 2011
PM Peak:	72 miles, 10.5% increase over 2011
Off-Peak Night:	10 miles, 24% increase over 2011

Lost Lane Miles at 35 miles per hour

FIGURE 12

AVERAGE NON-HOLIDAY WEEKDAY EQUIVALENT LOST LANE MILES

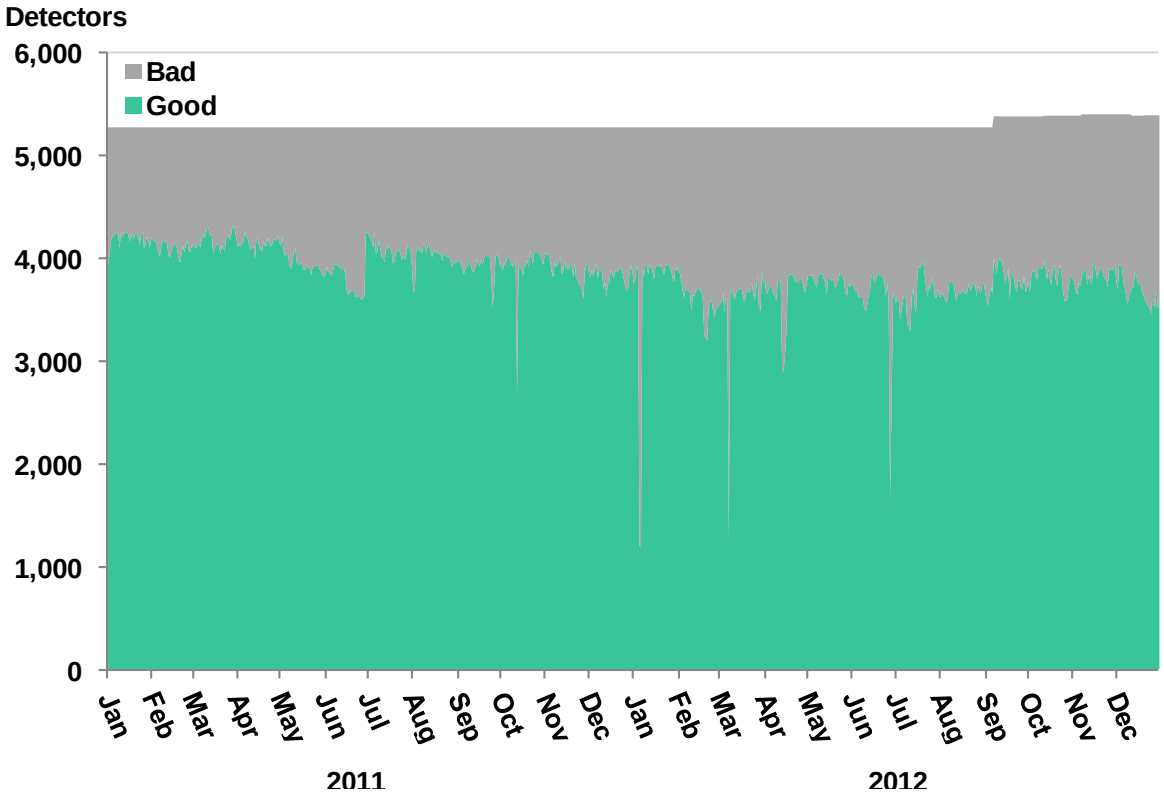


5. DETECTOR HEALTH AND DATA QUALITY

Directional Mainline Miles:	578 miles
Directional Mainline Miles with Detection:	390 miles
Number of Detectors at End of 2012:	5,401, 2% increase over 2011
Average Percentage of Good and Bad Detection:	70% good, 7.7% decrease over 2011; 30% bad, 27.1% increase over 2011
Number of Days Reporting less Than 50% Working Detection:	5

FIGURE 13

DETECTOR HEALTH BY DAY, 2011-2012



6. FREEWAY CONGESTION AND BOTTLENECK LOCATIONS

6.1. Congestion by Freeway

Congestion Contributed by Top Congested Freeways: 26,009,023 hours,
100% of total VHD in 2012

Table 3. TOP CONGESTED FREEWAYS, 2011-2012

Route	County	Vehicle Hours of Delay at 60 mph		Difference (2012 - 2011)		Rank	
		2011	2012	Absolute	Percent	2011	2012
I–5	Orange	7,728,734	8,098,821	370,087	5%	1	1
I–405	Orange	5,436,501	6,246,872	810,371	15%	2	2
SR–91	Orange	3,657,120	3,235,483	-421,637	-12%	3	3
SR–57	Orange	2,165,512	3,162,837	997,325	46%	5	4
SR–55	Orange	2,356,787	2,735,502	378,715	16%	4	5
SR–22	Orange	1,069,336	1,089,160	19,825	2%	6	6
SR–74	Orange	0	570,927	570,927			7
SR–73	Orange	358,253	410,764	52,511	15%	7	8
SR–241	Orange	202,343	259,877	57,533	28%	8	9
I–605	Orange	174,457	198,783	24,325	14%	9	10
TOTALS		**23,149,042**	**26,009,023**	**2,859,981**	**12.4%**		

6.2. Bottleneck Locations

Total Delay, All AM Bottlenecks: 2,541,195 hours
Top Bottleneck Delay, AM: 1,355,895 hours
Percentage Top Bottleneck Delay of Total Bottleneck Delay, AM: 53%

Table 4 (A). TOP BOTTLENECKS, AM PEAK PERIOD

Rank	County	City	Freeway	CA Postmile	Approximate Location	Average Extent (miles)	Total Delay (hours)	Average Daily Delay (hours)	Average Duration (hours)	Percent of Days Active
1	Orange	Brea	SR57–S	19.730	Imperial Hwy	2.34	172,484	1,065	2.3	65%
2	Orange	Huntington Beach	I405–S	16.260	Edinger Ave	3.29	171,023	1,000	2.0	68%
3	Orange	Orange	SR55–S	13.200	La Veta Ave	2.02	166,626	744	2.3	89%
4	Orange	Irvine	I405–N	4.030	Jeffrey Rd 2	2.85	152,571	723	1.3	84%
5	Orange	Orange	SR57–S	10.800	Rte SR–22 & I–5	2.54	143,747	609	1.9	94%
6	Orange	Santa Ana	SR55–S	R9.19	Edinger Ave	2.05	134,502	623	2.0	86%
7	Orange	Fountain Valley	I405–S	14.540	Bushard St	1.58	108,130	443	1.9	97%
8	Orange	Huntington Beach	I405–S	16.600	Beach Blvd	2.88	106,533	888	2.0	48%
9	Orange	Tustin	SR55–S	10.400	South of I–5	2.08	103,608	423	1.6	98%
10	Orange	Santa Ana	I5–S	30.900	1st St	1.70	96,671	441	1.3	87%

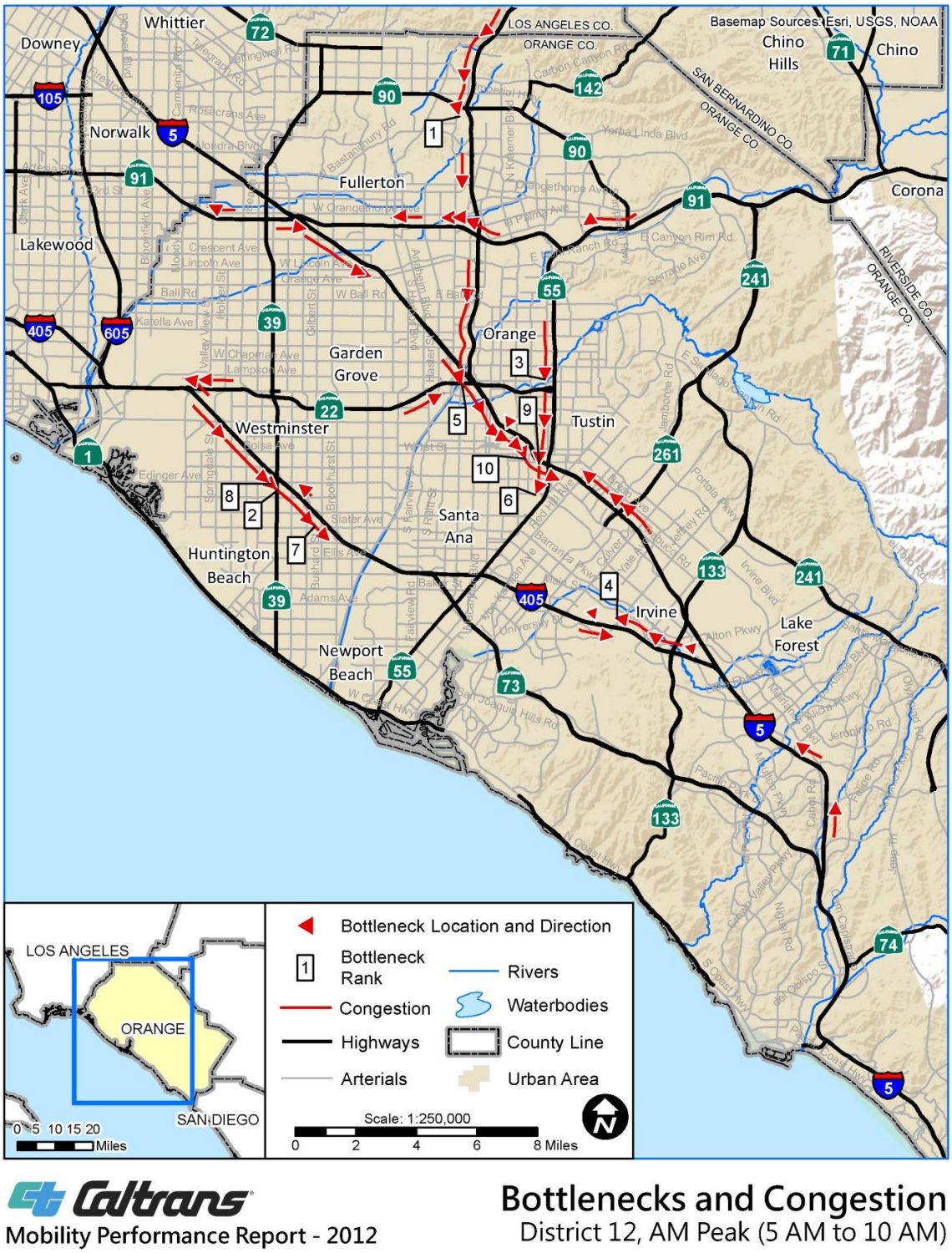
Total Delay, All PM Bottlenecks: 4,954,671 hours
Top Bottleneck Delay, PM: 2,673,749 hours
Percentage Top Bottleneck Delay of Total Bottleneck Delay, PM: 54%

Table 4 (B). TOP BOTTLENECKS, PM PEAK PERIOD

Rank	County	City	Freeway	CA Postmile	Approximate Location	Average Extent (miles)	Total Delay (hours)	Average Daily Delay (hours)	Average Duration (hours)	Percent of Days Active
1	Orange	Anaheim	SR91–E	R16.4	Gypsum Canyon	2.58	523,766	2,297	4.2	91%
2	Orange	Fountain Valley	I405–N	13.970	Brookhurst St	3.67	510,702	2,110	3.4	96%
3	Orange	Santa Ana	I5–N	32.600	17th St 3	1.45	336,798	1,347	4.1	100%
4	Orange	Irvine	I405–S	3.840	Jeffrey Rd 1	3.38	246,115	1,104	2.1	89%
5	Orange	Laguna Hills	I5–S	18.700	El Toro Rd 2	2.84	234,110	1,005	2.0	93%
6	Orange	Santa Ana	SR55–N	R8.12	Dyer Rd	1.93	209,698	863	2.3	97%
7	Orange	Tustin	I5–N	29.240	Red Hill Ave	3.33	200,202	914	1.6	87%
8	Orange	Anaheim	I5–N	36.600	Anaheim Blvd	2.91	144,790	596	1.2	97%
9	Orange	Brea	SR57–N	22.000	Tonner Canyon	4.68	143,892	911	1.8	63%
10	Orange	Costa Mesa	SR55–S	R2.77	Victoria St	2.93	123,675	783	1.6	63%

FIGURE 14 (A)

BOTTLENECKS AND CONGESTED SEGMENTS, AM PEAK PERIOD



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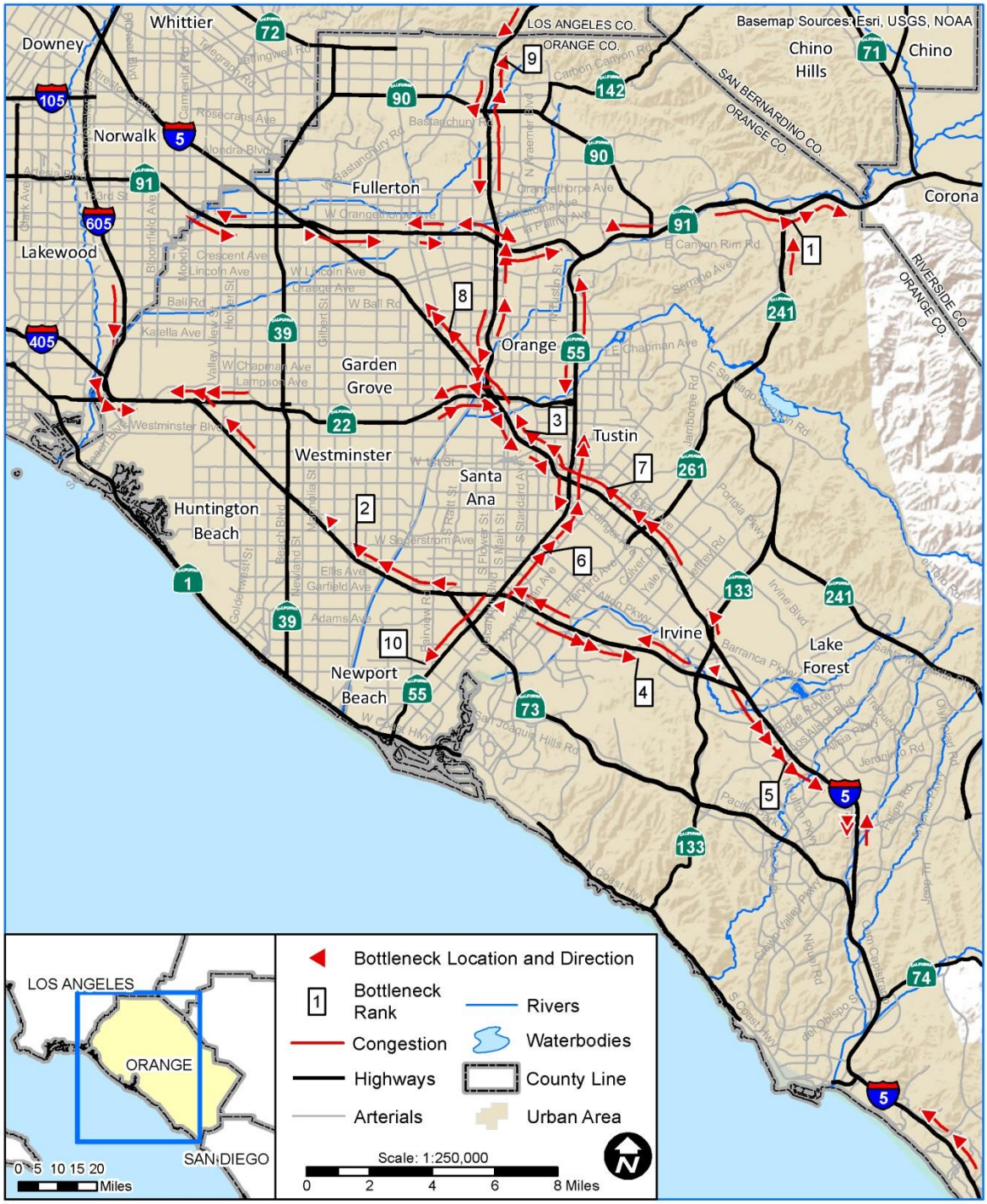
Bottlenecks and Congestion
District 12, AM Peak (5 AM to 10 AM)

FIGURE 14 (B)

BOTTLENECKS AND CONGESTED SEGMENTS, PM PEAK PERIOD



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Bottlenecks and Congestion
District 12, PM Peak (3 PM to 8 PM)